IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, after the Title, please insert the following heading and paragraph:

PRIORITY CLAIM

Applicant claims priority benefits under 35 U.S.C. § 119 on the basis of Patent Application No. 60/531,475, filed December 19, 2003.

Please amend the paragraph beginning on page 6, line 30, with the following rewritten paragraph:

Operation of the preferred embodiments will be discussed with respect to an exemplary embodiment residential broadband access system that is shown in FIGs. 1 and 2. In FIG 1, the access system has a plurality of Internet access lines 101 to 104 with a wireless community 1000 formed by a wireless communication medium and protocol 200 (a set of radio frequency channels, for example). The internet access lines in the FIG. 1 embodiment are within respective residential units 2~~000~~01-2~~000~~04 of the wireless community 1000, and connect to the Internet 3~~000~~00. Also shown are a couple of web servers 4~~000~~01 and 4~~000~~02 that client computers in the residential units 2~~000~~01-2~~000~~04 may communicate with through the Internet access lines 101 to 104 and the Internet 3~~000~~00. For discussing implementation of a meta-ISP embodiment, a proxy server 5~~000~~00 is shown as connected to the Internet for access by proxy servers within the residential units 2~~000~~01-2~~000~~04.

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Please amend the paragraph beginning on page 7, line 10, with the following rewritten paragraph:

An exemplary residential unit 20001-20004 is illustrated in FIG 2. A residential unit may contain one or more personal computers 51, 52, interconnected by a Local Area Network (LAN) 40. A modem 10 provides for communication on a residential access line 100. For example, the residential access line could be a regular telephone line, or a DSL line, and the modem 10 would then be either a dial-up modem or a DSL modem. If the residential access line represents a coaxial cable that also delivers television signals, the modem 10 would be a cable modem. A wireless communication interface 20 conducts communications with the other residential units in the wireless community over a wireless channel or channels 200 that follow a protocol, e.g. IEEE 802.11. The interface 20 may be a Wireless LAN access point, for example. A collection of wireless interfaces implements the wireless community 1000 illustrated in FIG. 1. A gateway 30 controls how the wireless network 1000 is used to enhance the utility of the residential access lines 101-104. The gateway 30 could be a stand-alone hardware device, or could be implemented in software and integrated with the wireless interface 20. Alternatively, a software implementation of a gateway could reside on one of the computers 51 or 52. Indeed, as will be clear to those skilled in the art, the modem 10, wireless interface 20, and the gateway 30 can be integrated into one of the computers 51 or 52.

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Please amend the paragraph beginning on page 7, line 27, with the following rewritten paragraph:

A residential unit 2~~00~~01-2~~00~~04 can represent a house or a unit in an apartment or condominium complex. However, as has been discussed above, the invention also applies to other clients, such as places of business that use dial-up lines, DSL, or cable modems for access to the Internet.

Please amend the paragraph beginning on page 8, line 1, with the following rewritten paragraph:

The web servers 4~~00~~01, 4~~00~~02 and the host 41~~00~~0 represent devices computers inside residential units 2~~00~~01-2~~00~~04 communicate with. For example, when a user browses the web on a computer, web pages are displayed. The web pages contain objects that reside on web servers 4~~00~~01-4~~00~~02. As another example, a user inside a residential unit may wish to transfer a computer file to or from a remote host 41~~00~~0. The wireless community network (WCN) 1000 is thus used to enhance the performance of the residential access lines 101-104. In additional embodiments, a substitute medium and protocol is used in place of the wireless communication medium Example substitute mediums include communications over power lines or using line-of-sight optical links. "HomePlug" is an evolving industry standard (http://www.homeplug.org/), and it provides a substitute medium and protocol for forming a client community in additional preferred embodiments.

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Please amend the paragraph beginning on page 8, line 23, with the following rewritten paragraph:

A request made from a client computer inside a residential unit 2~~00~~<u>0</u>1-2~~00~~<u>0</u>4 to initiate a TCP session with a device outside the wireless community, e.g. one of the web servers 4~~00~~<u>0</u>1, 4~~00~~<u>0</u>2, is redirected by the gateway device 30 acting as a local proxy within the same residential unit to a remote proxy (another gateway device) that resides in another one of the residential units 2~~00~~<u>0</u>1-2~~00~~<u>0</u>4, through the wireless communication medium 200 and protocol. The remote proxy then makes TCP session requests on behalf of the client computer that originally made the TCP session request. After the session is initiated, data packets from the session that originate at the device outside the wireless community are then transported to the remote proxy. The remote proxy then forwards these data packets via the wireless medium and protocol to the local proxy, which in turn forwards the packets to the client computer that originally initiated the session.

Please amend the paragraph beginning on page 9, line 4, with the following rewritten paragraph:

Similarly, after the session is initiated, data packets originating at the client computer that initiated the TCP session are redirected by the local proxy to the remote proxy via the wireless communication medium and protocol. In turn, the remote proxy forwards

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these session data packets to the device outside the wireless community, e.g., one of the web servers 40001, 40002, that was the original target of the TCP session request. The gateway devices 30 act as a network of proxies in the neighborhood that performs a load balancing function, attempting to spread the TCP session requests from all residential units so that traffic is divided evenly across all of the access lines 101-104 in the residential units 20001-20004 of the wireless community. Packets originating from a client computer inside a residential unit that are not recognized as belonging to a session are transported through the Internet access line that terminates at the residential unit, and thus do not need to be transported via the wireless communication network.

Please amend the paragraph beginning on page 10, line 12, with the following rewritten paragraph:

Consider a data transfer between a computer 51 and a web server 40001 using a session-oriented protocol, which is initiated by the computer 51. With the present invention, such a session may be altered, without modification of the protocols at the endpoints. In particular, the gateway device 30 attached to the local computer 51 acts as a proxy to facilitate the data transfer, as has been discussed generally above. Another proxy, referred to as the remote proxy, also facilitates the data transfer. The remote proxy resides on the gateway device within another residential unit belonging to the same wireless community network 1000. The invention alters the session in the following way. When the local

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computer 51 first initiates a communication with the web server 4001, the local proxy residing inside the local gateway device 30 intercepts the packets associated with this communication and determines that a session initiation is taking place. The local proxy acts in accordance with how the web server would act, hence the name proxy. In particular, instead of the session taking place between the local computer 51 and the web server 4001, the session takes place between the local computer 51 and the local proxy 30. In order to facilitate the data transfer, the local proxy selects another proxy, called a remote proxy. The remote proxy resides in the gateway device 30 inside another residential unit belonging to the same wireless community network 1000. The selection of the residential unit that contains the remote proxy, among all of the residential units 2001-2004 belonging to the wireless community network 1000, can be made on the basis of the state of the wireless community network 1000, past selection decisions, as well as on the basis of the pattern of recent activity on the residential access lines 101-104. For example, the proxies may exchange state information on the wireless community network and the residential access lines, and use this state information to form the basis for a selection decision. In an exemplary embodiment, a round robin approach is used for selection, and this and other scheduling algorithms may be used.

Please amend the paragraph beginning on page 11, line 6, with the following rewritten paragraph:

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After local proxy implemented by a gateway 30 intercepts the packet associated with the session initiation by the local computer 51, the local proxy initiates a session with the remote proxy implemented by another gateway device in the wireless community network 1000. This session takes place via the wireless community medium and protocol 200. In turn, the remote proxy initiates a session with the web server 40001, via the residential access line (one of the Internet access lines 101-104) attached to the remote proxy. In effect, the remote proxy communicates directly with the web server 40001 instead of the local computer 51.

Please amend the paragraph beginning on page 11, line 14, with the following rewritten paragraph:

The remote proxy forwards session data packets from the web server 40001 to the local proxy 30 via the wireless community network 1000, which in turn forwards the session data packets to the local computer 51. Similarly, in the other direction, the local proxy 30 forwards session data packets from the local computer 51 to the remote proxy via the wireless community network 1000, which in turn forwards the session data packets to the web server 40001.

Please amend the paragraph beginning on page 12, line 9, with the following rewritten paragraph:

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The Meta-ISP embodiment is similar to the ISP-Unaware embodiment, except that each gateway device 30 acts only as a local proxy. Instead of remote proxies being located at residential units 20001-20004 throughout the wireless community 1000, a dedicated proxy server 50000 acts as proxy server for all residential units 20001-20004. This proxy server and can be located within or outside the neighborhood, and within or outside the local-ISPs that terminate the residential access lines. In an example embodiment, the proxy server 50000 is accessible through the Internet.

Please amend the paragraph beginning on page 12, line 16, with the following rewritten paragraph:

A request made from a client computer, e.g., 51, 52 within the wireless community 1000 to initiate a TCP session with a device, e.g., one of the web servers 40001, 40002, outside the wireless community is redirected by the gateway 30 implementing a local proxy within the same residential unit to the proxy server 50000. The proxy server 50000 then makes TCP session requests on behalf of the client computer that originally made the TCP session request. After the session is initiated, data packets from the session that originate at the web server 40001 or 40002 are then transported to the proxy server 50000. The proxy server 50000 then forwards these data packets to the local proxy implemented by a gateway device, which in turn forwards the packets to the client computer that originally initiated the session. Similarly, after the session is initiated, data packets originating at the

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client computer that initiated the TCP session are redirected by the local proxy to the proxy server 5~~000~~00. In turn, the proxy server 5~~000~~00 forwards these session data packets to the web server that was the original target of the TCP session request.

Please amend the paragraph beginning on page 13, line 1, with the following rewritten paragraph:

The communication between a gateway device 30 implementing a local proxy function and the proxy server 5~~000~~00 can take place by using any of a plurality of Internet access lines in residential units that are within the wireless community, making use of the wireless communication medium and protocol that interconnects the residential units. Traffic can be divided across these residential access lines at the granularity of a packet, and thus the load can be evenly spread across the residential access lines. The decision process for each packet that determines which residential access line will be used to transport the packet can be based on the state of the wireless network, the past history of decisions for other packets, as well as the current state of the residential access lines. The network of local proxies may exchange state information to facilitate this decision process. For example, the local proxies can use such state information to estimate the total load placed on each residential access line, and attempt to distribute load evenly among the residential access lines. The local proxies and the proxy server 5~~000~~00 can also implement packet reordering, to increase the chances that packets will be transported end-to-end in the same order they were originally

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sent. The packet reordering can be implemented with sequence numbers that are inserted into the packets traveling between the proxy server 5~~00~~00 and the local proxies. In addition, the local proxies and proxy server can provide encryption and decryption to each packet that travels between them, thereby alleviating the privacy concerns discussed earlier. In particular, data flowing across residential access lines as well as between residential units is encrypted, making Internet communications less susceptible to eavesdropping by neighbors. Packets originating from a computer inside a residential unit that are not recognized as belonging to a session are transported through the residential access line that terminates at the residential unit, and thus do not need to be transported via the wireless communication network.

Please amend the paragraph beginning on page 13, line 26, with the following rewritten paragraph:

The Meta-ISP embodiment does not require cooperation from a local-ISP that terminates one or more of the residential access lines 101-104. The proxy server 5~~00~~00 may be separate from any local-ISP. However, if all the residential access lines 101-104 are terminated by the same local-ISP, and the local-ISP wishes to cooperate with the sharing of residential access lines pursuant to the invention, then the proxy server can be operated by the local-ISP. This is an ISP-aware variation of the Meta-ISP embodiment.

Please amend the paragraph beginning on page 14, line 1, with the following rewritten paragraph:

An example communication will be discussed with respect to the system shown in FIGs. 1 and 2. Consider a data transfer between a computer 51 and a web server 4~~00~~0̲1 using a session-oriented protocol, which is initiated by the computer 51. Such a session may be altered, without modification of the protocols at the endpoints. In particular, the gateway device 30 attached to the local computer 51 acts as a local proxy to facilitate the data transfer. When the local computer 51 first initiates communication with the web server 4~~00~~0̲1, the local proxy intercepts the packets associated with this communication and determines that a session initiation is taking place. The local proxy acts in accordance with how the web server 4~~00~~0̲1 would act. In particular, instead of the session taking place between the local computer 51 and the web server 4~~00~~0̲1, the session takes place between the local computer 51 and the local proxy 30. To facilitate the data transfer, the local proxy 30 communicates with the proxy server 5~~00~~0̲0. The proxy server 5~~00~~0̲0 initiates a session with the web server 4~~00~~0̲1. In effect, the proxy server 5~~00~~0̲0 communicates directly with the web server 4~~00~~0̲1 instead of the local computer 51.

Please amend the paragraph beginning on page 14, line 15, with the following rewritten paragraph:

The proxy server 50000 forwards session data packets from the web server 40001 to the local proxy 30, which in turn forwards the session data packets to the local computer 51. Similarly, in the other direction, the local proxy 30 forwards session data packets from the local computer 51 to the proxy server 50000, which in turn forwards the session data packets to the web server 40001.

Please amend the paragraph beginning on page 14, line 20, with the following rewritten paragraph:

To facilitate communication between the local proxy 30 and the proxy server 50000, any of the residential access lines 101-104 may be used, making use of the wireless community network 1000. The selection of which residential access line to use for a particular packet can be made on the basis of the state of the wireless community network 1000 or the pattern of recent traffic on the residential access lines 101-104, for example. Once the selection is made, the packet can be forwarded accordingly. For example, for a packet received from the web server 40001, the proxy server 50000 can prepend a label to the packet that specifies the gateway device within the residential unit that terminates the selected residential access line. This label can be inserted into the destination address field of a packet whose payload is the packet that is to be transported, for example. The proxy server

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5000 then forwards the packet to the gateway device associated with the selected residential access line. Upon receiving the packet, the gateway device then strips the label prepended by the proxy server 5000 off of the packet. The packet is then forwarded through the wireless interface associated with the gateway device, and delivered to the local proxy via the wireless community network 1000.

Please amend the paragraph beginning on page 15, line 4, with the following rewritten paragraph:

For a packet from a local proxy to the proxy server 5000, this process is simply reversed. In particular, a residential access line 101-104 is selected as before. The local proxy 30 forwards the packet to the wireless interface 20 for delivery through the wireless community network 1000 to the gateway device associated with the selected residential access line, which in turn forwards the packet to the proxy server 5000 via the selected residential access line. The packet is appropriately pre-pended with labels to facilitate forwarding the packet in the manner just described, as will be clear to those skilled in the art. The local proxy and the proxy server 5000 can periodically communicate to facilitate the selection of appropriate residential access lines, and therefore spread the traffic load across the residential access lines, in both directions.

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Please amend the paragraph beginning on page 15, line 14, with the following rewritten paragraph:

In addition, packets sent from the proxy server 50~~00~~00 to the local proxies may be labeled with sequence numbers. The local proxies can use the sequence numbers to determine the order in which they were sent by the proxy server 50~~00~~00, and delay packets appropriately so that they are forwarded to the local computer 51 in the same order that they were sent by the proxy server 50~~00~~00. This packet reordering feature may improve the performance of data transfers substantially, due to the fact that many session-oriented protocols assume that the underlying network usually delivers packets in the same order in which they are sent.

Please amend the paragraph beginning on page 15, line 22, with the following rewritten paragraph:

In the reverse direction, packets sent from the local proxy 30 to the proxy server 50~~00~~00 may be labeled with sequence numbers. The proxy server 50~~00~~00 can use the sequence numbers to determine the order in which they were sent by the local proxy 30, and delay packets appropriately so that they are forwarded to the web server 40~~00~~01 in the same order that they were sent by the local computer 51.

Please amend the paragraph beginning on page 15, line 27, with the following rewritten paragraph:

To provide privacy, the proxy server 5~~000~~00 may encrypt packets that are sent to a local proxy via the wireless medium and protocol 200. When the packets reach the local proxy 30, the local proxy may decrypt the packets before forwarding them to the local computer 51. In the reverse direction, the local proxy 30 may encrypt the packets that are sent to the proxy server 5~~000~~00. When the packets reach the proxy server 5~~000~~00, the proxy server may decrypt the packets before forwarding them to the web server 4~~000~~01. A degree of privacy is thus achieved between the residential units, since the packets traveling between the residential units 2~~000~~01-2~~000~~04 as well as through the residential access lines are encrypted.